15.579 eBusiness Technologies
Spring 2000 Syllabus

COURSE DESCRIPTION

The purpose of this course is to provide future managers with a broad introduction to the technologies that are enabling the eBusiness revolution. Using a combination of lectures, hands-on assignments and case studies, the course covers both the fundamental building blocks of today’s Web-based systems (databases, networks, clients and servers) as well as the most important classes of applications that enable today and tomorrow’s electronic businesses. Although the focus of the course is on technology, significant attention is also given to discussing the connection of the presented technologies to business processes and strategic objectives.

TEACHING STAFF

Instructor: Prof. Chris Dellarocas (E53-315, 258-8115, dell@mit.edu; http://ccs.mit.edu/dell/)
Teaching Assistants: Ramon Frausto (frausto@mit.edu)
Susan Wise (swise@mit.edu)
Secretary: Debbie Thomas (E53-316, 253-6616, debiet@mit.edu)

AUDIENCE AND PREREQUISITES

15.579 is an introductory course. It is assumed that students know how to use Macintosh or IBM PC word processors and spreadsheets. No knowledge of how computers work or are programmed is assumed. Students who have recently completed courses in computer architecture, operating systems, and telecommunications probably should not take this course, because most of the course consists of highlights of those topics. Student backgrounds vary considerably, however. Students with some background in electrical engineering or programming will breeze through certain topics, though it is hoped that the discussion of current eBusiness application classes as well as the term project (see below) will benefit them as well. Those with no background will have to work harder, but mastery of this material is within reach of every MIT student regardless of background.

Important Note: Due to significant overlap between 15.579 and 15.564, students who have taken 15.564 with Prof. Dellarocas in the past are not eligible to enroll in 15.579 in Spring 2000.

Talk to the instructor if you’re not sure whether your background is appropriate.
LOGISTICS

1) Lectures. Tuesday and Thursday 2:30-4 PM in E56-270

2) Recitation. Friday 11-12 PM in E56-270. The purpose of recitation is to:
   a) review material covered in class during the week;
   b) provide additional examples and exercises that aid understanding;
   c) cover additional topics related to the material of the week.

**Due to the intense pace of this course, we strongly recommend that you try to attend as many recitations as possible!**

3) TAs' office hours. To be determined.

4) Professor's office hours. Tuesdays 4-5 PM. Other times by appointment. Email is strongly encouraged!

READINGS, LECTURE NOTES AND TEXTBOOKS

One of the unusual aspects of this course is the diversity of student objectives, backgrounds and previous exposure to the subject matter. To accommodate this diversity we propose that each student select his or her individualized sets of supplementary study materials from the list below. We will describe the recommended study materials and the strategy for choosing between them in the first session of the course. Please feel free to send us email if you have questions related to the best study materials for you.

**Required materials**

Lecture notes are preprints of Powerpoint slides used by the instructor during lectures. They are fairly detailed and comprehensive (typically between 20-30 slides per lecture). In the past, most students found that the slides were the primary resource they used for reviewing the class material. Suggested study strategy: skim the lecture notes before class, then read carefully after class. We will be distributing lecture notes in class at the beginning of each lecture. **Alternatively, lecture slides can be downloaded from the class web page (see below).**

Xeroxed readings contain textbook chapters and magazine articles whose main purpose is to supplement the lecture notes and serve as a reference for the topics covered in class. Since this is a new course, we will be distributing readings in class as we go.

**Recommended materials**

There are two recommended textbooks:

- **Price Waterhouse's Technology Forecast: 1999** is available at the MIT Coop and on reserve at the Dewey library. In addition to a concise technical introduction to the various topics covered, it provides excellent surveys of the marketplace, including pointers to leading vendors and products, as well as assessments of trends and directions. Our recommendation: Students with no previous exposure in IT might find this a bit heavy. On the other hand, students who have had some previous IT exposure and especially MBA students who are interested in connecting the technological principles we will learn in the lectures with the marketplace will find this an excellent reference.

- **Ron White, et. al. HOW COMPUTERS WORK (Millennium Edition), Zipf Davis (1999)**. Good introductory text on the internals of computer hardware and system software. Recommended if you don't have a background in science or engineering. Science and engineering majors might find this book too elementary. You may purchase this book from Amazon.com.
The following is a list of recommended resources available on the Web:

- **The PC Webopedia** ([http://www.pcwebopedia.com](http://www.pcwebopedia.com)) is a Web site that serves as an encyclopedia of Information Technology terms. It provides excellent explanations of Information Technology terms, together with links to additional web pages related to them. For each lecture, the course Web page contains pointers to the relevant category of the PC Webopedia. We strongly encourage you to use this valuable resource to clarify unanswered questions and to go beyond the material covered in class, according to your own personal interests.

- **Dictionary of PC hardware and Data Communication Terms** ([http://www.oreilly.com/reference/dictionary/](http://www.oreilly.com/reference/dictionary/)) is the online version of a very well written, out of print book by Mitchell Shnier. It also provides excellent explanations of several hardware and communication-related terms, from the well-known (BIOS) to the obscure (Speedo). Explanations are often more technical than the PC Webopedia.

- **Philip and Alex’s Guide to Web Publishing** ([http://photo.net/wtr/thebook/](http://photo.net/wtr/thebook/)) is the online version of a very well written book on database-backed, collaborative web sites and services. Does it sound like a niche? It’s not; almost all the sites and services of any value are database-backed. It can get technical, but the main ideas are excellent and you can always skip the code. Caveat: Philip does not care much for traditional businesses and for many of their executives (but his attitude is not worse than Dilbert’s).

- **Forrester Research** ([http://www.forrester.com](http://www.forrester.com)) is one of the leading independent research firms that analyze the future of technology change and its impact on businesses, consumers, and society. Their reports are available for free via the Web to all Sloan Students. If you are not a Sloan student and are registered for this course, please contact the TAs for instructions on how to access them.

Finally, for students who would like to learn Microsoft Access in depth, the following are two recommended textbooks (you may choose either):

  Good, concise introduction to Microsoft Access at a level compatible with this course. Recommended for students who need a supplementary Access text for the needs of this course. Students who want to go into more depth, please see next textbook.

  One of the best and most detailed “bibles” on Microsoft Access. Coverage is way beyond what will be covered in this course. This is an excellent reference book for students who are interested in becoming Microsoft Access experts. If you are looking for something more concise, you may consider the Byrne textbook.

**Assignments, Exams, and Grading**

The course assignments consist of 5 problem sets, a quiz and a term project. Grades will be determined on the following basis:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Problem sets</td>
<td>30%</td>
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<tr>
<td>In-class quiz</td>
<td>30%</td>
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<tr>
<td>Term project</td>
<td>30%</td>
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<tr>
<td>Class contribution</td>
<td>10%</td>
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**Assignments are due in class during the due dates.** In special circumstances (e.g., illness, religious holidays) we’ll try to be accommodating, if you make arrangements with us in advance. Late
assignments will be penalized by 10% per 24 hours if you have not made arrangements in advance, and will not be accepted at all 48 hours after the time due.

**There are several ways to earn "Class Contribution" points.** First and foremost is to come prepared for class, ask questions that other students want to know the answer to, and give clear, brief answers to questions I ask. Second is to locate magazine or newspaper articles that are relevant to the class and to bring a photocopy to me for distribution to the entire class. Third is to do follow-up research in order to answer an interesting question that comes up in class. In short, if you help other students learn, you get class contribution points.

**CLASS WEB PAGE**

The 15.579 class Web page is located at: [http://web.mit.edu/15.579/](http://web.mit.edu/15.579/)

The 15.579 Web page contains a wealth of information related to the course, such as the course syllabus, downloadable copies of the lecture notes, problem sets and various course-related announcements. For some sessions, it also provides links to additional (optional) reading material found on the Web. Our web page will be updated frequently during the term. You are encouraged to visit it often!

**COMPUTER FACILITIES**

This is a course about Information Technology and several assignments require use of a PC. Students can use either their own PC or the facilities of the Sloan School Computer Center. The access code for the Sloan School Computer Center is **0911** (this is subject to change). If you do not have a Sloan lab account, we will provide one after the first week of classes. You are responsible for getting your own email account (everybody in the MIT community is entitled to an Athena email account).

**COLLABORATION POLICY**

You are encouraged to discuss material from the class with other students, including material related to problem sets. You must, however, write solutions independently. The time to stop collaborating is when you start writing. In addition, you must write on your problem sets and machine problems the name of anyone with whom you collaborated.

**Do:** discuss general concepts and techniques for performing the hands-on assignments; compare and discuss answers after you get the problem sets back.

**Don’t:** copy or compare answers before you turn them in; debug each others’ programs; sit together while you are writing up your solutions.

**Consequences:** If you copy or allow copying in violation of these rules, both parties get 0 on the entire assignment. If you do it again, you go to a discipline committee.

**Finally, it is strictly forbidden to consult and/or copy your answers from solution sets of past terms. Students who violate this rule will be asked to drop the class.**

If you’re stuck on a particular problem and need help that would violate the collaboration policy, contact the TAs or the instructor. We’ll help.
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<th>#</th>
<th>Day</th>
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<th>Topic</th>
<th>Assignments</th>
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<td><strong>The Basics: Hardware, OS, and Software</strong></td>
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<td>1</td>
<td>Tu</td>
<td>Feb 1</td>
<td>Introduction: Course Overview; Inside the CPU</td>
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<td>2</td>
<td>Th</td>
<td>Feb 3</td>
<td>Computer Architecture: Processing, Memory and I/O</td>
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<td></td>
<td>Fr</td>
<td>Feb 4</td>
<td><em>Recitation: Web page construction</em></td>
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<td>3</td>
<td>Tu</td>
<td>Feb 8</td>
<td>Computer Representations; Compression</td>
<td>PS1 out</td>
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<td>4</td>
<td>Th</td>
<td>Feb 10</td>
<td>Operating Systems</td>
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<td>Fr</td>
<td>Feb 11</td>
<td><em>Recitation: Compilers, Interpreters, Programming Lang.</em></td>
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<td><strong>Databases</strong></td>
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<td>5</td>
<td>Tu</td>
<td>Feb 15</td>
<td>Relational Databases; Database queries using SQL</td>
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<td>6</td>
<td>Th</td>
<td>Feb 17</td>
<td>An Introduction to Microsoft Access</td>
<td>PS2 out</td>
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<td>Fr</td>
<td>Feb 18</td>
<td><em>Recitation: SQL queries</em></td>
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<td></td>
<td>Tu</td>
<td>Feb 22</td>
<td>NO CLASS – Monday schedule for classes</td>
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<tr>
<td>7</td>
<td>Th</td>
<td>Feb 24</td>
<td>Relational database design</td>
<td>PS1 due</td>
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<td>Feb 25</td>
<td><em>Recitation: Database design examples</em></td>
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<td><strong>Networks and Telecommunications</strong></td>
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<td>8</td>
<td>Tu</td>
<td>Feb 29</td>
<td>Telecommunication Concepts; Data Transmission</td>
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<td>9</td>
<td>Th</td>
<td>Mar 2</td>
<td>Local Area Networks; Ethernet; Packet-switched Networks</td>
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<td></td>
<td>Fr</td>
<td>Mar 3</td>
<td>*Recitation: Building Access Applications; Forms and Reports</td>
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<td><strong>Client/Server and Web Technologies</strong></td>
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<td>10</td>
<td>Tu</td>
<td>Mar 7</td>
<td>Wide Area Networks; The Internet</td>
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<td><strong>Client/Server Systems</strong></td>
<td>PS2 due</td>
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<td>11</td>
<td>Th</td>
<td>Mar 9</td>
<td>Security I: Overview; cryptography</td>
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<td>Fr</td>
<td>Mar 10</td>
<td><em>Recitation: Wireless Network Technologies</em></td>
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<td>12</td>
<td>Tu</td>
<td>Mar 14</td>
<td>Security II: network security; digital cash</td>
<td>PS4 out</td>
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<td>Th</td>
<td>Mar 16</td>
<td>NO CLASS – Sloan Spring Vacation</td>
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<td>Tu</td>
<td>Mar 21</td>
<td>NO CLASS – MIT Spring Vacation</td>
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<td>NO CLASS – MIT Spring Vacation</td>
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<td>13</td>
<td>Tu</td>
<td>Mar 28</td>
<td>Recitation: Wireless Network Technologies</td>
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<td>Mar 30</td>
<td>World Wide Web Technologies</td>
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<td>Fr</td>
<td>Mar 31</td>
<td><em>Recitation: Using pgp</em></td>
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<tr>
<td>15</td>
<td>Tu</td>
<td>Apr 4</td>
<td>Quiz review</td>
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<td>16</td>
<td>Th</td>
<td>Apr 6</td>
<td>Quiz in class</td>
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<td>Fr</td>
<td>Apr 7</td>
<td><em>Recitation: Term Project Meeting</em></td>
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<td><strong>eBusiness Applications</strong></td>
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<td>17</td>
<td>Tu</td>
<td>Apr 11</td>
<td>Intranets; Knowledge management; Groupware</td>
<td>PS5 out</td>
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<td>18</td>
<td>Th</td>
<td>Apr 13</td>
<td>Commerce Servers</td>
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<td>Fr</td>
<td>Apr 14</td>
<td><em>Recitation: Connecting a database to the Web</em></td>
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<td>Tu</td>
<td>Apr 18</td>
<td>NO CLASS – MIT Holiday (Patriots Day)</td>
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<td>19</td>
<td>Th</td>
<td>Apr 20</td>
<td>Scalability and Fault Tolerance Issues</td>
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<td>Fr</td>
<td>Apr 21</td>
<td><em>Recitation: Setting up a commerce server</em></td>
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<tr>
<td>20</td>
<td>Tu</td>
<td>Apr 25</td>
<td>Enterprise Information Systems</td>
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<td>21</td>
<td>Th</td>
<td>Apr 27</td>
<td>Data Mining, Data Warehousing</td>
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<td>Fr</td>
<td>Apr 28</td>
<td><em>Recitation: Web site customization technologies</em></td>
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<td>22</td>
<td>Tu</td>
<td>May 2</td>
<td>B2B e-Commerce applications</td>
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<td>23</td>
<td>Th</td>
<td>May 4</td>
<td>Student Presentations I</td>
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<td>Fr</td>
<td>May 5</td>
<td><em>Recitation: TBD</em></td>
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<tr>
<td>24</td>
<td>Tu</td>
<td>May 9</td>
<td>Student Presentations II</td>
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<tr>
<td>25</td>
<td>Th</td>
<td>May 11</td>
<td>Trends in eBusiness technology; Course wrap-up</td>
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</tbody>
</table>
PROBLEM SETS

PS 1: Computer Fundamentals
PS 2: Relational Databases
PS 3: Graphical User Interfaces
PS 4: Networks and Computer Security
PS 5: Setting up an electronic store

READINGS

The following readings are required unless otherwise noted. Additional readings may be announced during the semester. The PC Webopedia links are optional, but highly recommended. The class web page will contain links to additional (optional) reading materials found on the Web.

Session 1: Introduction
NO READINGS

Session 2: Computer architecture
Optional: Technology Forecast:
- Computing Platforms pages 277, 288-301
- Storage pages 303, 312-315, 326-330, 331-335
- Microprocessors pages 337, 338-345, 354-356, 362-368
How Computers Work: Chapters 10-25, 32
PC Webopedia – Hardware category page (http://www.pcwebopedia.com/Hardware_cat.html)
PC Webopedia – PC definition and links (http://www.pcwebopedia.com/PC.htm)

Recitation: Web page construction
C. Dellarocas, A. Bernstein. Web Home Page Construction, 15.579 Teaching Note
PC Webopedia – Web Development category page
(http://www.pcwebopedia.com/Web_Development_cat.html)

Session 3: Computer representations
How Computers Work: Chapter 8
PC Webopedia – Data formats category page
(http://www.pcwebopedia.com/Data_Formats_cat.html)
Terms to look up: binary, floating-point numbers, character set, ASCII, HTML, bitmap, Postscript, PDF, data compression, MPEG

Session 4: Operating systems
Optional: Technology Forecast: pages 699, 700-705, 709-715, 723-729
How Computers Work: Chapters 2-4, 7
PC Webopedia – Operating Systems category page
(http://www.pcwebopedia.com/Operating_Systems_cat.html)
Terms to look up: operating systems, multitasking, virtual memory, file management system, file allocation table, Windows, Linux
Recitation: Programming languages; Software system development
W. W. Gibbs. Software's Chronic Crisis, Scientific American, Sept. 1994, pp. 86-95
How Computers Work: Chapter 6
Optional: Technology Forecast: pages 465, 466-479, 484-493, 501-509
PC Webopedia – Programming Languages category page
(http://www.pcwebopedia.com/Programming_Languages_cat.html)
Terms to look up: programming language, compiler, interpreter, Java

Session 5: Relational databases
(plus pp. 143-144)
SQL tutorial at http://w3. ione.net/~jhoffman/ sql tut.html
Optional: Technology Forecast: pages 567, 569-575, 585-592

Session 6: Microsoft Access
Recommended textbooks: “In Business with Access” or “Running Microsoft Access”

Session 7: Relational database design

Session 8: Data communications
PC Webopedia – Networks category page (http://www.pcwebopedia.com/Networks_cat.html)

Session 9: LANs and WANs
How Computers Work: Chapter 37

Recitation: Building Access applications
The lecture notes will cover everything you need to know about building Microsoft Access applications for this course. In addition, the textbooks recommended under Session 6 can serve as a useful reference.

Session 10: OSI protocols and the Internet
How Computers Work: Chapter 38
W. Stallings, Data and Computer Communications (5th Edition), pages 510-526

Session 11: Client/Server Systems
E. Ullman. Client/Server Frees Data. Byte, June 1993, pp. 96-106
[Alternatively: Orfali Chapters 2-3]
Client/Server Software Architectures—An Overview
(http://www.sei.cmu.edu/str/descriptions/clientserver_body.html)
Optional: Technology Forecast 663, 664-669
PC Webopedia – Client/Server Computing category page
(http://www.pcwebopedia.com/Client_Server_Computing_cat.html)
Terms to look up: client/server architecture, fat client, thin client, two-tier, three-tier, middleware
Session 12: Security I
Optional: Technology Forecast: pages 593, 594-597, 601-606, 615-618
Terms to look up: biometrics, virus, macro virus, antivirus program
PC Webopedia – Encryption category page
(http://www.pcwebopedia.com/Encryption_cat.html)
Terms to look up: symmetric-key cryptography, DES, public-key encryption, RSA, Pretty Good Privacy

Session 13: Security II
How SSL Works. Available on the Web from
Optional: Technology Forecast: pages 606-610, 611-615, 624-626
PC Webopedia – Encryption category page
(http://www.pcwebopedia.com/Encryption_cat.html)
Terms to look up: authentication, digital signature, digital certificate, PKI, SSL, digital cash, smart card

Session 14: World Wide Web Technologies
How Computers Work: Chapter 41
[XML Ref?]
Optional: Technology Forecast: pages 149-160, 163-171
PC Webopedia – World Wide Web category page
(http://www.pcwebopedia.com/World_Wide_Web_cat.html)

Session 17: Intranets; Knowledge Management; Groupware
(http://www.forrester.com/ER/PDF/0,1521,7298,00.pdf)
TBD

Session 18: Commerce Servers
(http://www.forrester.com/ER/Research/Report/0,1338,7274,FF.html)
Optional: Technology Forecast: pages 203-221

Recitation: Building a web-enabled database
(http://photo.net/wtr/thebook/databases-interfacing.html)

Session 19: Scalability and Fault Tolerance Issues
(http://www.forrester.com/ER/Research/Report/0,1338,5881,FF.html)
Session 20: Enterprise Information Systems
D. Kirkpatrick. The E-Ware Wars: Competition Comes to Enterprise Software. Fortune, December 7, 1998.
Optional: Technology Forecast: pages 404-418
For a good selection of articles on corporate applications and trends, visit the Datamation magazine web site at http://www.datamation.com or the InformationWeek magazine web site at http://www.informationweek.com

Session 21: Data warehousing, Data mining
Two Crows Corporation. Introduction to Data Mining and Knowledge Discovery
Optional: Technology Forecast: pages 428-437, 448-450

Recitation: Web site customization

Session 22: B2B e-Commerce applications
For more information about B2B marketplaces, visit http://www.netmarketmakers.com or http://b2business.net/